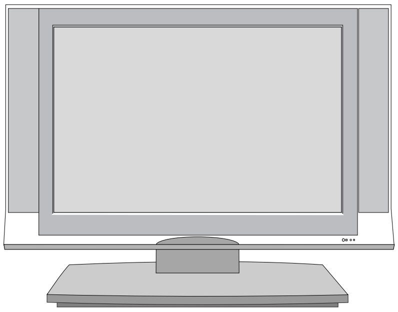
website:http://biz.LGservice.com

LCD TV
SERVICE MANUAL

CHASSIS : LN71A

MODEL : 15LS1RA 15LS1RA-MK

CAUTION
BEFORE SERVICING THE CHASSIS,
READ THE SAFETY PRECAUTIONS IN THIS MANUAL.



CONTENTS

SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ in the Schematic Diagram and Replacement Parts List.
It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent Shock, Fire, or other Hazards.
Do not modify the original design without permission of manufacturer.

General Guidance

An **isolation Transformer should always be used** during the servicing of a receiver whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks.

It will also protect the receiver and it's components from being damaged by accidental shorts of the circuitry that may be inadvertently introduced during the service operation.

If any fuse (or Fusible Resistor) in this TV receiver is blown, replace it with the specified.

When replacing a high wattage resistor (Oxide Metal Film Resistor, over 1W), keep the resistor 10mm away from PCB.

Keep wires away from high voltage or high temperature parts.

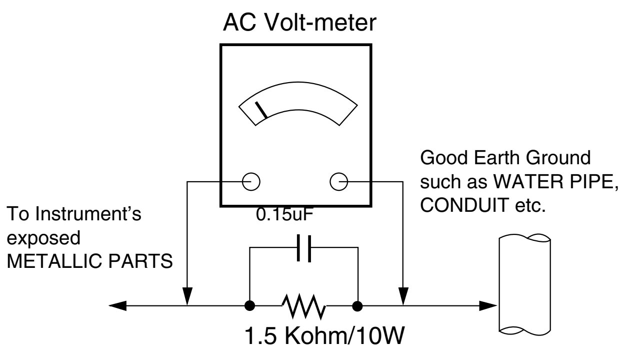
Before returning the receiver to the customer,

always perform an **AC leakage current check** on the exposed metallic parts of the cabinet, such as antennas, terminals, etc., to be sure the set is safe to operate without damage of electrical shock.

Leakage Current Cold Check(Antenna Cold Check)
With the instrument AC plug removed from AC source, connect an electrical jumper across the two AC plug prongs. Place the AC switch in the on position, connect one lead of ohm-meter to the AC plug prongs tied together and touch other ohm-meter lead in turn to each exposed metallic parts such as antenna terminals, phone jacks, etc.
If the exposed metallic part has a return path to the chassis, the measured resistance should be between 1MΩ and 5.2MΩ.
When the exposed metal has no return path to the chassis the reading must be infinite.
An other abnormality exists that must be corrected before the receiver is returned to the customer.

Leakage Current Hot Check (See below Figure)
Plug the AC cord directly into the AC outlet.
Do not use a line Isolation Transformer during this check.
Connect 1.5K/10watt resistor in parallel with a 0.15uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.
Measure the AC voltage across the resistor using AC voltmeter with 1000 ohms/volt or more sensitivity.
Reverse plug the AC cord into the AC outlet and repeat AC voltage measurements for each exposed metallic part. Any voltage measured must not exceed 0.75 volt RMS which is corresponds to 0.5mA.
In case any measurement is out of the limits specified, there is possibility of shock hazard and the set must be checked and repaired before it is returned to the customer.

Leakage Current Hot Check circuit



SERVICING PRECAUTIONS

CAUTION: Before servicing receivers covered by this service manual and its supplements and addenda, read and follow the *SAFETY PRECAUTIONS* on page 3 of this publication.

NOTE: If unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions on page 3 of this publication, always follow the safety precautions. Remember: Safety First.

General Servicing Precautions

1. Always unplug the receiver AC power cord from the AC power source before;
   a. Removing or reinstalling any component, circuit board module or any other receiver assembly.
   b. Disconnecting or reconnecting any receiver electrical plug or other electrical connection.
   c. Connecting a test substitute in parallel with an electrolytic capacitor in the receiver.
   CAUTION: A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.

2. Test high voltage only by measuring it with an appropriate high voltage meter or other voltage measuring device (DVM, FETVOM, etc) equipped with a suitable high voltage probe.
   Do not test high voltage by "drawing an arc".
3. Do not spray chemicals on or near this receiver or any of its assemblies.
4. Unless specified otherwise in this service manual, clean electrical contacts only by applying the following mixture to the contacts with a pipe cleaner, cotton-tipped stick or comparable non-abrasive applicator; 10% (by volume) Acetone and 90% (by volume) isopropyl alcohol (90%-99% strength)
   CAUTION: This is a flammable mixture.
   Unless specified otherwise in this service manual, lubrication of contacts in not required.
5. Do not defeat any plug/socket B+ voltage interlocks with which receivers covered by this service manual might be equipped.
6. Do not apply AC power to this instrument and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.
7. Always connect the test receiver ground lead to the receiver chassis ground before connecting the test receiver positive lead.
   Always remove the test receiver ground lead last.
8. *Use with this receiver only the test fixtures specified in this service manual.*
   CAUTION: Do not connect the test fixture ground strap to any heat sink in this receiver.

Electrostatically Sensitive (ES) Devices

Some semiconductor (solid-state) devices can be damaged easily by static electricity. Such components commonly are called *Electrostatically Sensitive (ES) Devices.* Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed to prevent potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static type solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.
   CAUTION: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

General Soldering Guidelines

1. Use a grounded-tip, low-wattage soldering iron and appropriate tip size and shape that will maintain tip temperature within the range or 500°F to 600°F.
2. Use an appropriate gauge of RMA resin-core solder composed of 60 parts tin/40 parts lead.
3. Keep the soldering iron tip clean and well tinned.
4. Thoroughly clean the surfaces to be soldered. Use a mall wire-bristle (0.5 inch, or 1.25cm) brush with a metal handle.
   Do not use freon-propelled spray-on cleaners.
5. Use the following unsoldering technique
   a. Allow the soldering iron tip to reach normal temperature. (500°F to 600°F)
   b. Heat the component lead until the solder melts.
   c. Quickly draw the melted solder with an anti-static, suction-type solder removal device or with solder braid.
   CAUTION: Work quickly to avoid overheating the circuit board printed foil.
6. Use the following soldering technique.
   a. Allow the soldering iron tip to reach a normal temperature (500°F to 600°F)
   b. First, hold the soldering iron tip and solder the strand against the component lead until the solder melts.
   c. Quickly move the soldering iron tip to the junction of the component lead and the printed circuit foil, and hold it there only until the solder flows onto and around both the component lead and the foil.
   CAUTION: Work quickly to avoid overheating the circuit board printed foil.
   d. Closely inspect the solder area and remove any excess or splashed solder with a small wire-bristle brush.

IC Remove/Replacement
Some chassis circuit boards have slotted holes (oblong) through which the IC leads are inserted and then bent flat against the circuit foil. When holes are the slotted type, the following technique should be used to remove and replace the IC. When working with boards using the familiar round hole, use the standard technique as outlined in paragraphs 5 and 6 above.

Removal
1. Desolder and straighten each IC lead in one operation by gently prying up on the lead with the soldering iron tip as the solder melts.
2. Draw away the melted solder with an anti-static suction-type solder removal device (or with solder braid) before removing the IC.

Replacement
1. Carefully insert the replacement IC in the circuit board.
2. Carefully bend each IC lead against the circuit foil pad and solder it.
3. Clean the soldered areas with a small wire-bristle brush. (It is not necessary to reapply acrylic coating to the areas).

"Small-Signal" Discrete Transistor Removal/Replacement
1. Remove the defective transistor by clipping its leads as close as possible to the component body.
2. Bend into a "U" shape the end of each of three leads remaining on the circuit board.
3. Bend into a "U" shape the replacement transistor leads.
4. Connect the replacement transistor leads to the corresponding leads extending from the circuit board and crimp the "U" with long nose pliers to insure metal to metal contact then solder each connection.

Power Output, Transistor Device Removal/Replacement
1. Heat and remove all solder from around the transistor leads.
2. Remove the heat sink mounting screw (if so equipped).
3. Carefully remove the transistor from the heat sink of the circuit board.
4. Insert new transistor in the circuit board.
5. Solder each transistor lead, and clip off excess lead.
6. Replace heat sink.

Diode Removal/Replacement
1. Remove defective diode by clipping its leads as close as possible to diode body.
2. Bend the two remaining leads perpendicular y to the circuit board.
3. Observing diode polarity, wrap each lead of the new diode around the corresponding lead on the circuit board.
4. Securely crimp each connection and solder it.
5. Inspect (on the circuit board copper side) the solder joints of the two "original" leads. If they are not shiny, reheat them and if necessary, apply additional solder.

Fuse and Conventional Resistor Removal/Replacement
1. Clip each fuse or resistor lead at top of the circuit board hollow stake.
2. Securely crimp the leads of replacement component around notch at stake top.
3. Solder the connections.
   CAUTION: Maintain original spacing between the replaced component and adjacent components and the circuit board to prevent excessive component temperatures.

Circuit Board Foil Repair
Excessive heat applied to the copper foil of any printed circuit board will weaken the adhesive that bonds the foil to the circuit board causing the foil to separate from or "lift-off" the board. The following guidelines and procedures should be followed whenever this condition is encountered.

At IC Connections
To repair a defective copper pattern at IC connections use the following procedure to install a jumper wire on the copper pattern side of the circuit board. (Use this technique only on IC connections).

1. Carefully remove the damaged copper pattern with a sharp knife. (Remove only as much copper as absolutely necessary).
2. carefully scratch away the solder resist and acrylic coating (if used) from the end of the remaining copper pattern.
3. Bend a small "U" in one end of a small gauge jumper wire and carefully crimp it around the IC pin. Solder the IC connection.
4. Route the jumper wire along the path of the out-away copper pattern and let it overlap the previously scraped end of the good copper pattern. Solder the overlapped area and clip off any excess jumper wire.

At Other Connections
Use the following technique to repair the defective copper pattern at connections other than IC Pins. This technique involves the installation of a jumper wire on the component side of the circuit board.

1. Remove the defective copper pattern with a sharp knife. Remove at least 1/4 inch of copper, to ensure that a hazardous condition will not exist if the jumper wire opens.
2. Trace along the copper pattern from both sides of the pattern break and locate the nearest component that is directly connected to the affected copper pattern.
3. Connect insulated 20-gauge jumper wire from the lead of the nearest component on one side of the pattern break to the lead of the nearest component on the other side.
   Carefully crimp and solder the connections.
   CAUTION: Be sure the insulated jumper wire is dressed so the it does not touch components or sharp edges.

SPECIFICATION

NOTE : Specifications and others are subject to change without notice for improvement.

1. General Specification

NO.	Item		Content			Remark
1	User Model Name		15LS1R-MK CSA(NTSC, PAL M/N)			
2	Feature		15" LCD TV			
3	Chassis Name		LN71A			
4	General Scope	External SW &Adj.	POWER, INPUT, MENU, ENTER, VOL(◀/▶), CH(▲/▼)			8Keys
5	Power Cord		Length : 1.87±0.04 M Shape : Wall-out, Color : BLACK			NATION
6	Power Adapter		No			
7	LCD Module Feature		Maker		CPT	
			Type		TFT Color LCD Module	P/N : EAJ36404601 CLAA150XP07
			Active Display Area		15.0 inches diagonal [304.1(H) x 228.1(V)]	
			Pixel Pitch [mm]		0.297mm(H) x 0.297mm(V) x RGB	
			Electrical interface		LVDS	
			Color Depth		6BIT WHITE FRC, 16.2M colors	
			Size [mm]		326.6(W) x 253.5(H) x 14.0(D)	
			Surface Treatment		Anti Glare	
			Operating Mode		Normally White, TN	
			Back light Unit		CCFL, 4 tables, edge-light(top/bottom)	
			R/T	Typ	R.T. : 5ms + F.T. : 6ms (Typ.)	

2. Mechanical specification

No.	Item		Content				Remark
1	Product Dimension		Width (W)		Length (D)	Height (H)	
		Before Packing	463.3		166.3	353.5	With Stand
		After Packing	527.0		175.0	470.0	
2	Product Weight	Only SET	3.94kg(CPT)				
		With BOX	5.04kg(CPT)				
3	Container Loading Quantity	Individual or Palletizing	20ft		40ft		
			Indi.	Wooden	Indi.	Wooden	
			858	720	1716	1584	
4	Stand Assy	Type	Base detachable				
		Size (W x D x H)	302.2(W) x 166.3(D) x 68(H)				
		Tilt Degree	-3(-0/+3) ~ +10(±2)				
		Tilt force	Target 1.5Kgf (0.8Kgf ~ 2.0Kgf)				
		Swivel Degree	—NON				
		Swivel Force	—NON				
5	Appearance	General	Refer to Standard of LG(55)G1-1020				

3. Engineering Specification

No.	ITEM	Specification		Remark
1	ENERGY	VIDEO	POWER CONSUMPTION	LED COLOR
	Normal	Active	≤ 40W	Green
	Stand By	Off	≤ 1W(110V) ≤ 1W(220V)	Red
2	D-SUB Pin configuration	1 : RED 3 : Blue 5 : S.T (GND) 7 : Green GND 9 : N.C 11: ID0(GND) 13: H-Sync 15: SCL	2 : Green 4 : ID2 (GND) 6 : RED GND 8 : Blue GND 10 : D-GND 12 :SDA 14 : V-Sync Shell : GND	10 : Digital GND
3	Control Function	1) Contrast/Brightness 2)H-Position/ V-Position 3) Tracking : Clock/Phase 4) Auto Configure 5) Reset		

4. Optical Characteristic

No	Item	Specification					Remark
				Min	Tpy	Max	
1	Viewing Angle [CR≥5]	Horizontal / Vertical		150	170		Deg
2	Luminance	Luminance (cd/m^2)		250	350		APC : Clear,ACC : Cool
		White Lumnance Uniformity		75%	80%		White (100 IRE)
3	Contrast Ratio	CR		2400	3000		All whit / All black (Set up Level = 0 IRE)
4	CIE Color Coordinates	White (Warm)	Wx	0.298	0.313	0.328	In Video input
			Wy	0.314	0.329	0.344	APC : Clear
		White (Normal)	Wx	0.270	0.285	0.300	White (85 IRE)
			Wy	0.278	0.293	0.308	
		White (Cool)	Wx	0.261	0.276	0.291	
			Wy	0.268	0.283	0.298	

5. Outgoing Condition

<table>
<tr><th>No</th><th colspan="2">Item</th><th colspan="2">Condition</th><th>Remark</th></tr>
<tr><td>1</td><td colspan="2">Power</td><td colspan="2">Off</td><td></td></tr>
<tr><td>2</td><td colspan="2">Volume Level</td><td colspan="2">30</td><td></td></tr>
<tr><td>3</td><td colspan="2">Main Picture Input</td><td colspan="2">TV</td><td></td></tr>
<tr><td>4</td><td colspan="2">Main Last Channel</td><td colspan="2">TV 2</td><td></td></tr>
<tr><td>5</td><td colspan="2">Mute</td><td colspan="2">Off</td><td></td></tr>
<tr><td rowspan="5">6</td><td rowspan="5">Channel</td><td>Auto Programme</td><td colspan="2">To start</td><td></td></tr>
<tr><td rowspan="3">Manual Programme</td><td colspan="2">TV 2</td><td></td></tr>
<tr><td colspan="2">Memory</td><td></td></tr>
<tr><td colspan="2">Fine 0</td><td></td></tr>
<tr><td>Favourite Programme</td><td colspan="2"></td><td></td></tr>
<tr><td rowspan="15">7</td><td rowspan="15">PICTURE</td><td rowspan="8">APC</td><td colspan="2">Clear</td><td></td></tr>
<tr><td colspan="2">Optimum</td><td></td></tr>
<tr><td colspan="2">Soft</td><td></td></tr>
<tr><td rowspan="5">User</td><td>Contrast 100</td><td></td></tr>
<tr><td>Brightness 50</td><td></td></tr>
<tr><td>Color 60</td><td></td></tr>
<tr><td>Sharpness 50</td><td></td></tr>
<tr><td>Tint 0</td><td></td></tr>
<tr><td rowspan="6">ACC</td><td colspan="2">Cool</td><td></td></tr>
<tr><td colspan="2">Normal</td><td></td></tr>
<tr><td colspan="2">Warm</td><td></td></tr>
<tr><td rowspan="3">User</td><td>Red 0</td><td></td></tr>
<tr><td>Green 0</td><td></td></tr>
<tr><td>Blue 0</td><td></td></tr>
<tr><td>Reset</td><td colspan="2">To set</td><td></td></tr>
<tr><td rowspan="7">8</td><td rowspan="7">SOUND</td><td rowspan="5">DASP</td><td colspan="2">Flat</td><td></td></tr>
<tr><td colspan="2">Music</td><td></td></tr>
<tr><td colspan="2">Movie</td><td></td></tr>
<tr><td colspan="2">Sports</td><td></td></tr>
<tr><td colspan="2">User</td><td></td></tr>
<tr><td>AVL</td><td colspan="2">Off</td><td></td></tr>
<tr><td>Balance</td><td colspan="2">0</td><td></td></tr>
<tr><td rowspan="4">9</td><td rowspan="4">TIME</td><td>Clock</td><td colspan="2">-- : -- AM</td><td></td></tr>
<tr><td>Off timer</td><td colspan="2">-- : -- AM
Off</td><td></td></tr>
<tr><td>On time</td><td colspan="2">-- : -- AM
Ch, TV 2
Vol. 30
Off</td><td></td></tr>
<tr><td>Auto off</td><td colspan="2">Off</td><td></td></tr>
<tr><td rowspan="7">10</td><td rowspan="7">SPECIAL</td><td>Language</td><td colspan="2">English</td><td>3 Languages</td></tr>
<tr><td>Key lock</td><td colspan="2">Off</td><td></td></tr>
<tr><td rowspan="5">Caption/ Text</td><td colspan="2">Mode 1</td><td></td></tr>
<tr><td colspan="2">Mode 2</td><td></td></tr>
<tr><td colspan="2">Text 1</td><td></td></tr>
<tr><td colspan="2">Text 2</td><td></td></tr>
<tr><td colspan="2">Off</td><td></td></tr>
</table>

ADJUSTMENT INSTRUCTION

1. Application Range

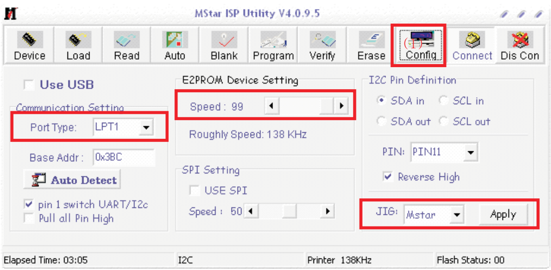
This document is applied to 15", 20" LCD TV.(chassis : LN71A)

2. Designation

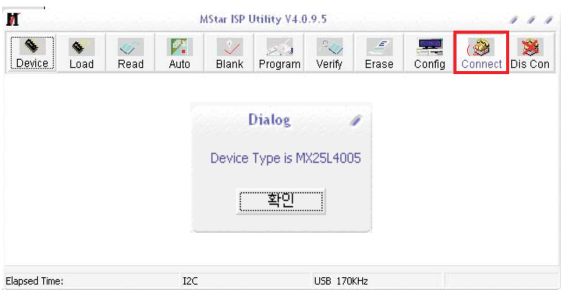
1) The adjustment is according to the order which is designated and which must be followed, according to the plan which can be changed only on agreeing.
2) Power Adjustment : Free Voltage
3) Magnetic Field Condition : Nil.
4) Input signal Unit : Product Specification Standard
5) Reserve after operation : Above 30 Minutes
6) Adjustment equipments: Color Analyzer(CA-210 or CA-110), Pattern Generator (MSPG-925L or Equivalent), DDC Adjustment Jig equipment, SVC remote controller

* Download

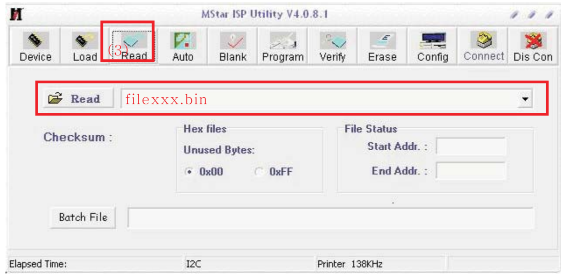
1) Execute ISP program "Mstar ISP Utility" and then click "Config" tab.
2) Set as below, and check the following tabs.
   * Port type - Choose the your port type, Normally "LPT1", or "LPT2"
   * Speed - Choose the speed from 70 to 99
   * JIG - Choose the your JIG type, Normally "Mstar" or "LGE", and then click the Apply.



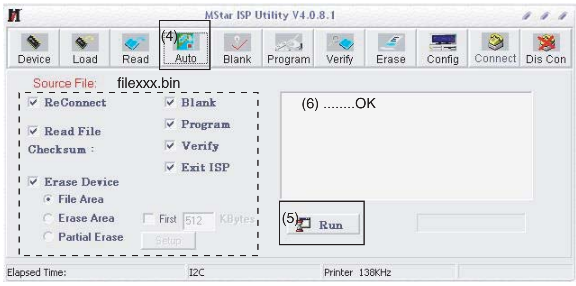
3) Click "Connect" tab. If flash memory is detected normally, Flash memory type will be displayed.
Example:'MX25L4005'(MX) or 'Winb25X40'(Winbond),,,etc



4) Click "Read" tab, and then load download file(XXXX.bin) by clicking "Read".



5) Click "Auto" tab and set as below, and then click "Run".



6) After downloading, check "OK" message.

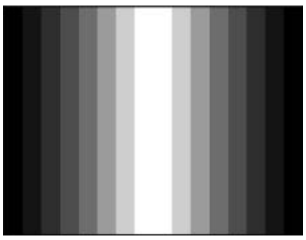
3. Main PCB check process

* APC - After Manual - Insert, executing APC

3.1. ADC Process

(1) PC input ADC (15inch only)

1) Auto RG Gain/ Offset Adjustment
   (a) Convert to PC in Input-source.
   (b) Signal equipment displays.
      - Output Voltage : 730 mVp-p
      - Impress Resolution XGA (1024 x 768 @ 60Hz)
      - Pattern : gray pattern that left & right is black and center is white signal.(Refer below picture) (Model : 60, Pattern : 28 at MSPG925L)

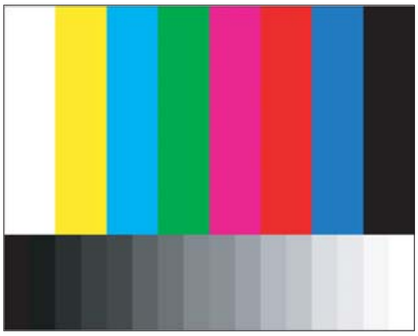


   (c) Adjust by commanding AUTO_COLOR_ADJUST (0xF1) 0x00 0x02 instruction.

2) Confirmation
   (a) We confirm whether “0x8C” address of EEPROM “0xB4” is “0xAA” or not.
   (b) If “0x8C” address of EEPROM “0xB4” isn’t “0xAA”, we adjust once more.
   (c) ADC result is displayed to “OK” or “NG” on left and lower of the screen.
   (d) We can confirm the ADC values from “0x00~0x05” addresses in a page “0xB4”.

(2) Component input ADC

1) Auto Component Gain/Offset adjustment
   a) Convert to Component in Input-source
   b) Signal equipment displays
      Output Voltage : 700 mVp-p
      Impress Resolution : Component 480p.
      Pattern: 8color & 16gray pattern(Refer below picture).
      (Model:212, Pattern: 8 at MSPG925L)



   c) Adjust by commanding AUTO_COLOR_ADJUST (0xF1) 0x00 0x02 instruction.

2) Confirmation
   a) We confirm whether “0x8E” address of EEPROM “0xB4” is “0xAA” or not.
   b) If “0x8C” address of EEPROM “0xB4” isn’t “0xAA”, we adjust once more
   c) ADC result is displayed to “OK” or “NG” on left and lower of the screen.
   d) We can confirm the ADC values from “0x00~0x05” addresses in a page “0xB4”.

* Manual ADC process(using Service Remocon)
- RGB & Component Mode
  After enter Service Mode by pushing “INSTART” key, execute “Auto-RGB” by pushing “_” key at “Auto-RGB”

Auto	Color Balance
ADC	RGB0OK CPNT-OK
Auto-RGB	To set
Red Offset	xxx
Green Offset	xxx
Blue Offset	xxx
Red Gain	xx
Green Gain	xx
Blue Gain	xx
Reset	To set

Before : “ADC RGB-NA” “ADC CPNT-NA”
After : “ADC RGB-OK” “ADC CPNT-OK”

3.2. Function Check

(1) Check display and sound

- Check Input and Signal items
  1) TV
  2) Video (CVBS/ S-Video)
  3) Component (YPbPr)
  4) RGB (PC : 1024 x 768@60Hz) - 15” only

* Display and Sound check is executed by Remote control.

4. Total Assembly line process

4.1. Adjustment Preparation

(1) Above 30 minutes Heat-run in RF no signal
(2)15 Pin D-Sub Jack is connected to the signal of Pattern Generator.

4.2. Confirm color coordinate of RGB-15” only

(1) Set Input to RGB
(2) Input signal : XGA(1024 x768 @ 60Hz), Full white 216/255 gray level (85 IRE, Model : 60, Pattern : 78 at MSPG925L)
(3) Set CSM : Cool
(4) Confirm whether x=0.276±0.03, y=0.283±0.03, y≥180 or not.

4.3. Confirm color coordinate of Video

(1) Set Input to Video.
(2) Input signal : CVBS, NTSC @ 60Hz
    Full White 216/255 gray level (85 IRE, Model : 201
    Patter : 78 at MSPG925L)
(3) Set APC : Clear / ACC : Cool
(4) Confirm whether x = 0.276±0.03, y = 0.283±0.03, y ≥ 180 (15”)/ Y ≥ 250(20”) or not.

4.4. Confirm color coordinate of Component

(1) Set Input to Component.
(2) Input signal : Component(YPbPr), 480P
    Full White 216/255 gray level and 480P
    (Model : 212 Patter : 78 at MSPG925L)
(3) Set APC : Clear / ACC : Cool
(4) Confirm whether x = 0.276±0.03, y = 0.283±0.03, y ≥ 180 (15”)/ Y ≥ 250(20”) or not.

4.5. Other quality

(1) Confirm that each items satisfy under standard condition that was written product spec.
(2) Confirm Video and Sound at each source.
  1) Video
     (a) Select input Video(S-video) and check whether picture is displayed or not.
     (b) Select input Video(CVBS) and check whether picture is displayed or not.
     (c) Select input Component 480P and check whether picture is displayed or not.
  2) TV : Select input TV and check below item.(In Gumi factory)
     CH04 (US-04) - Stereo Sound Check
     CH30 (US-30) - Dual Sound Check
     CH02 (US-02) - Stereo, SAP Sound Check
                  - Caption Check
  3) RGB(PC/DTV) - 15” only
     Select input RGB and check whether picture is displayed or not.
  4) Component
     Select input component and check whether picture is displayed or not.

4.6. Power consumption confirmation

(1) Check if Power LED Color and Power Consumption operate as standard.
(2) Measurement Condition : 230V@ 60Hz (Analog)
(3) Confirm Stand-by operation.

4.7. DDC EDID

(1) Connect D-sub Signal Cable to D-Sub Connector.
(2) Write EDID data to EEPROM(24C02) by using DDC2B protocol.
(3) Check whether written EDID data is correct or not. (refer to Product spec).

4.8. Outgoing condition Configuration

(1) After all function test, press IN-STOP Key by Service Remote control. And make ship condition.
(2) When pressing IN-STOP key by service remote control, green and red LED are blinked alternatively. And then Automatically turn off.(Must not AC power off during blinking)

4.9. Option data setting (SVC OSD setting)

- NTSC Service Mode OPTION DATA(According to Suffix)

	15LS1RA-MK	20LS1RA-MK
	3970	1920
Resolution	2	0
Module	0	0
TV	1	1
Video	1	1
COMPONENT	1	1
PC-RGB	1	0
DVI	0	0
HDMI	0	0

Area Option[A B]

PAL

(A) 0 : FACTORY MODE OFF
1 : FACTORY MODE ON
[Caution] FACTORY MODE ON only used in factory.

(B) 0: default Option setting.
1~4: The other Area Option setting.(Reserved)
[Caution] Initial Setting of Area Option is [1 0] in production line.
After IN-STOP, Area Option will change [0 0].
If Area Option isn't 00 after IN-STOP, must change to 00. (Using ▶ key on R/C)

NTSC

S. Am : For South America
Korea : For Korea

Item	Condition	Remark
2HR-OFF	1	0 : 2 Hour off option-OFF 1 : 2 Hour off option-ON
FACTORY-MODE	0	0 : EEPROM Write Protection On 1 : EEPROM Write Protection Off
CHANNEL-MUTE	1	0 : Channel Mute Off 1 : Channel Mute On

5. Adjustment Command

5.1. Adjustment Command(LENGTH=84)

No.	Adjustment Contents	CMD(hex)	ADR	VAL	Description
1	EEPROM ALL INIT.	E4	00	00	EEPROM all clear
2	EEPROM Read	E7	00	00	EEPROM Read
3	EEPROM Write	E8	00	data	EEPROM Write by some values
4	COLOR SAVE (R/G/B cutoff, Drive, Contrast, Bright)	EB	00	00	Color Save
5	H POSITION	20	00	00 – 100	They have different range each mode, FOS Adjustment
6	V POSITION	30	00	00 – 100	
7	CLOCK	90	00	00 – 100	
8	PHASE	92	00	00 – 100	
9	R DRIVE	16	00	00 – FF	Drive adjustment
10	G DRIVE	18	00	00 – FF	
11	B DRIVE	1A	00	00 – FF	
12	R CUTOFF	80	00	00 – 7F	Offset adjustment
13	G CUTOFF	82	00	00 – 7F	
14	B CUTOFF	84	00	00 – 7F	
15	BRIGHT	10	00	00 – 3F	Bright adjustment
16	CONTRAST	12	00	00 - 64	Luminance adjustment
17	AUTO_COLOR_ ADJUST	F1	00	02	Auto COLOR Adjustment
18	CHANGE_COLOR_ TEMP	F2	00	0, 1, 2, 3	0: COOL 1: NORMAL 2: WARM 3: USER
19	FACTORY_ DEFAULT	F3	00	00, FF	00: Factory mode off FF: Factory mode On
20	AUTO_ INPUTCHANGE	F4	00	0, 1, 2, 3	0 : TV 1 : AV1 2 : AV2 3 : Component 4 : RGB 5 : DVI

5.2. EEPROM DATA READ

(1) Signal Table

START | 6E | A | 50 | A | 84 | A | 03 | A | CMD | A | ADH | A | ADL | A | CS | A | STOP

Delay 100ms

START | 6F | A | D1 | A | - - - - - - - - - - | Dn | A | STOP

128 Bytes

(2) Command Set

Adjustment Contents	CMD(hex)	ADR(hex)	ADL(hex)	Details
EEPROM READ	E7	A0	0	0-Page 0~7F Read
			80	0-Page 80~FF Read
		A2	0	1-Page 0~7F Read
			80	1-Page 80~FF Read
		A4	0	2-Page 0~7F Read
			80	2-Page 80~FF Read
		A6	0	3-Page 0~7F Read
			80	3-Page 80~FF Read

Purpose : To read the appointment Address of E2PROM by 128(80h)-byte

5.3. E²PROM Data Write

(1) Signal Table

START | 6E | A | 50 | A | 84+n | A | 03 | A | CMD | A | ADH | A | ADL | A

Data_1 | A | . . . | Data_n | A | CS | A | STOP

LEN : 84h+Bytes
CMD : 8Eh
ADH : E²PROM Slave Address(A0,A2,A4,A6,A8), Not 00h(Reserved by BufferToEEPROM)
ADL : E2PROM Sub Address(00~FF)
Data : Write data

(2) Command Set

No.	Adjustment contents	CMD(hex)	LEN	Details
1	EEPROM WRITE	E8	94	16-Byte Write
2			84+n	n-byte Write

<Purpose>

1) EDID write : 16-byte by 16-byte, 8 order (128-byte) write (TO "00 – 7F" of "EEPROM Page A4")
2)FOS Default write : 16-mode data (HFh, HFl, VF, STD, HP, VP, Clk, ClkPh, PhFine) write
3) Random Data write : write the appointment Address of E2PROM

5.4. VRAM Read

1) Send CMD(70h) to read Video RAM value from MICOM And save its value to 128-Bytes Buffer(Common Buffer for the use of EDID).

START | 6F | A | Data1 | . . . | Data12 | A | CS | NA | STOP

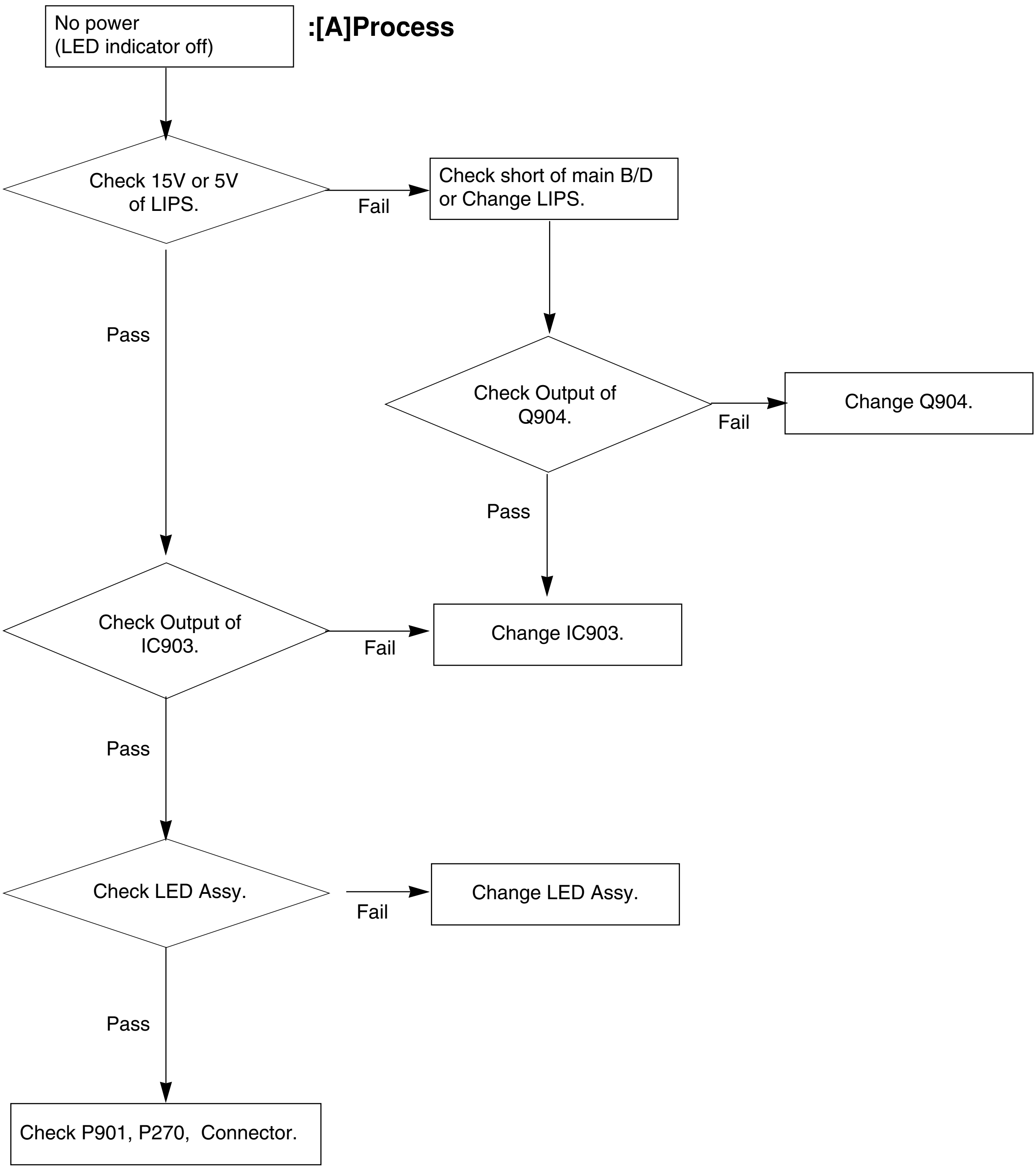
2) Delay 500ms(Time to wait and read vZideo RAM from MICOM)
3) Be transmitted the contents of MICOM's 128-bytes Buffer to PC.(128th Data is the CheckSum of 127-bytes data : That's OK if the value of adding 128-bytes Data is Zero)

START | 6E | A | 50 | A | 84 | A | 03 | A | 70 | A | 00 | A | 00 | A | CS | A | STOP

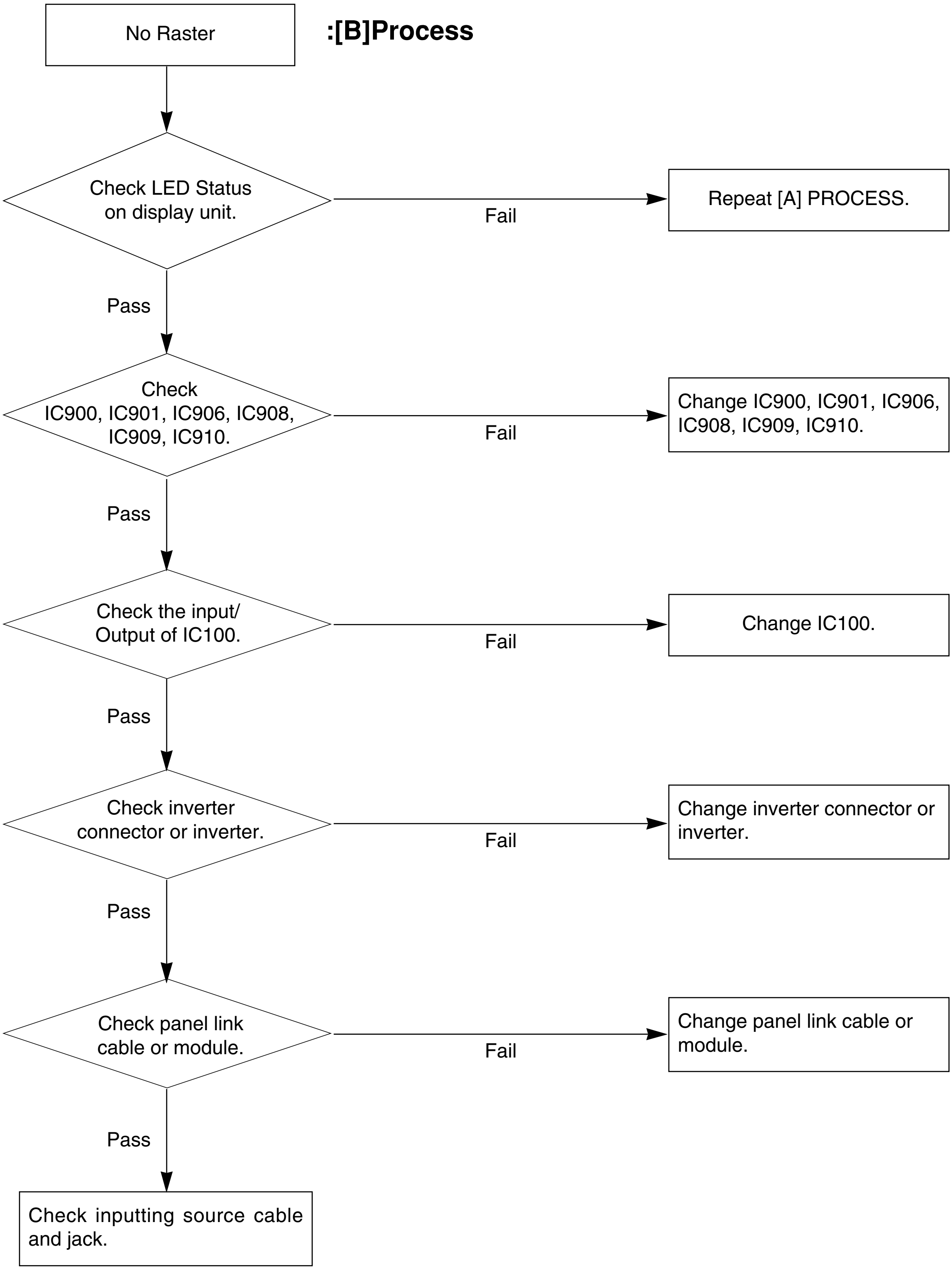
6. Signal Timing(Resolution) - 15” only

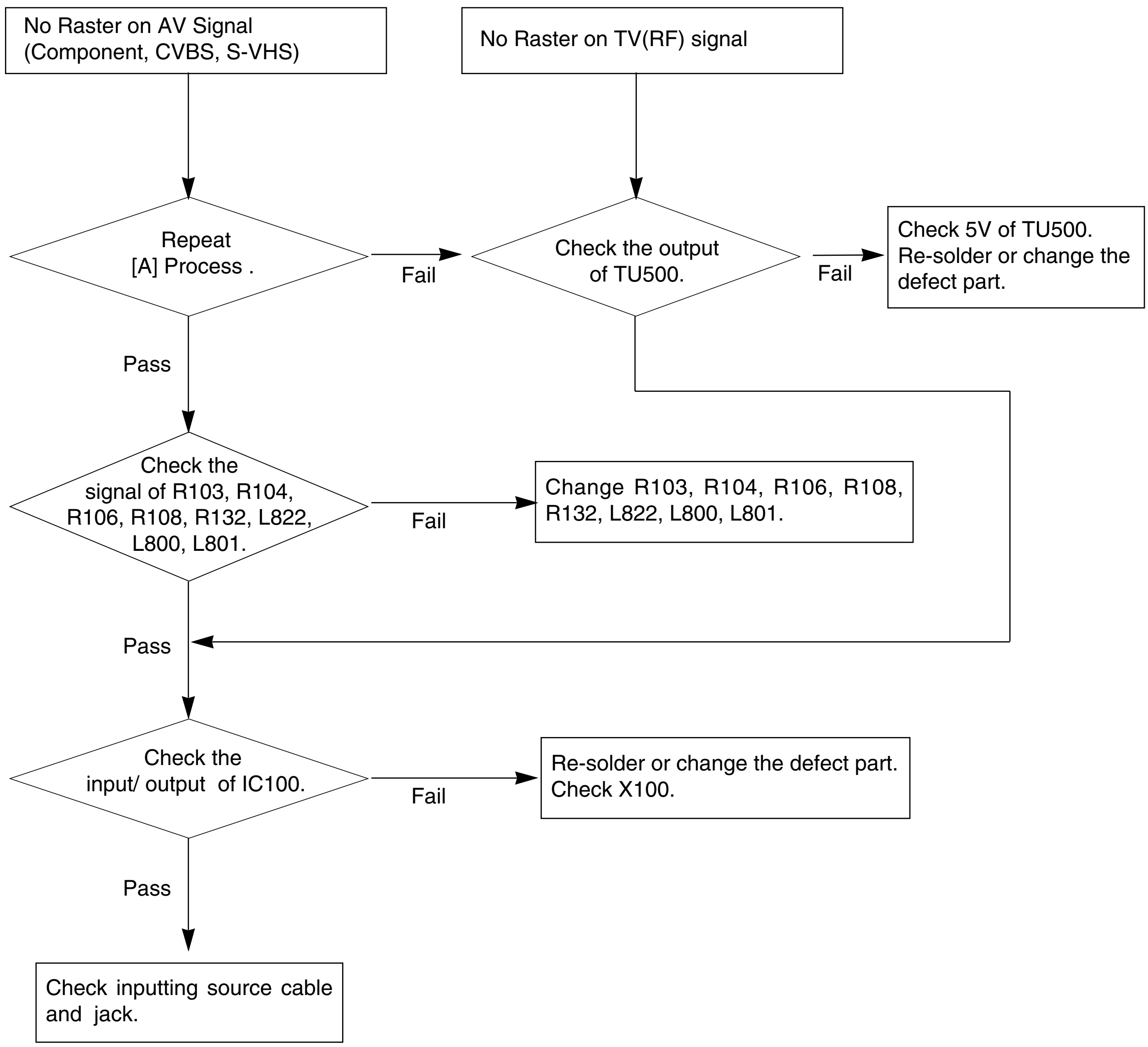
Mode	Section	Polarity	DOT CLOCK [MHz]	Frequency [kHz]/ [Hz]	Total Period(E)	Display(A)	Front Porch (B)	Sync.(D)	Back Porch (F)	Resolution	Remark
1	H(Pixels)	-	25.175	31.469	800	640	16	96	48	640 x 480	O
	V(Lines)	-		59.94	525	480	10	2	33		
2	H(Pixels)	+	40.0	37.879	1056	800	40	128	88	800 x 600	O
	V(Lines)	+		60.317	628	600	1	4	23		
3	H(Pixels)	+	35.999	35.156	1024	800	40	128	72	800 x 600	O
	V(Lines)	+		56.250	800	600	1	4	24		
4	H(Pixels)	-	65.0	48.363	1344	1024	24	136	160	1024 x 768	O
	V(Lines)	-		60.004	806	768	3	6	29		

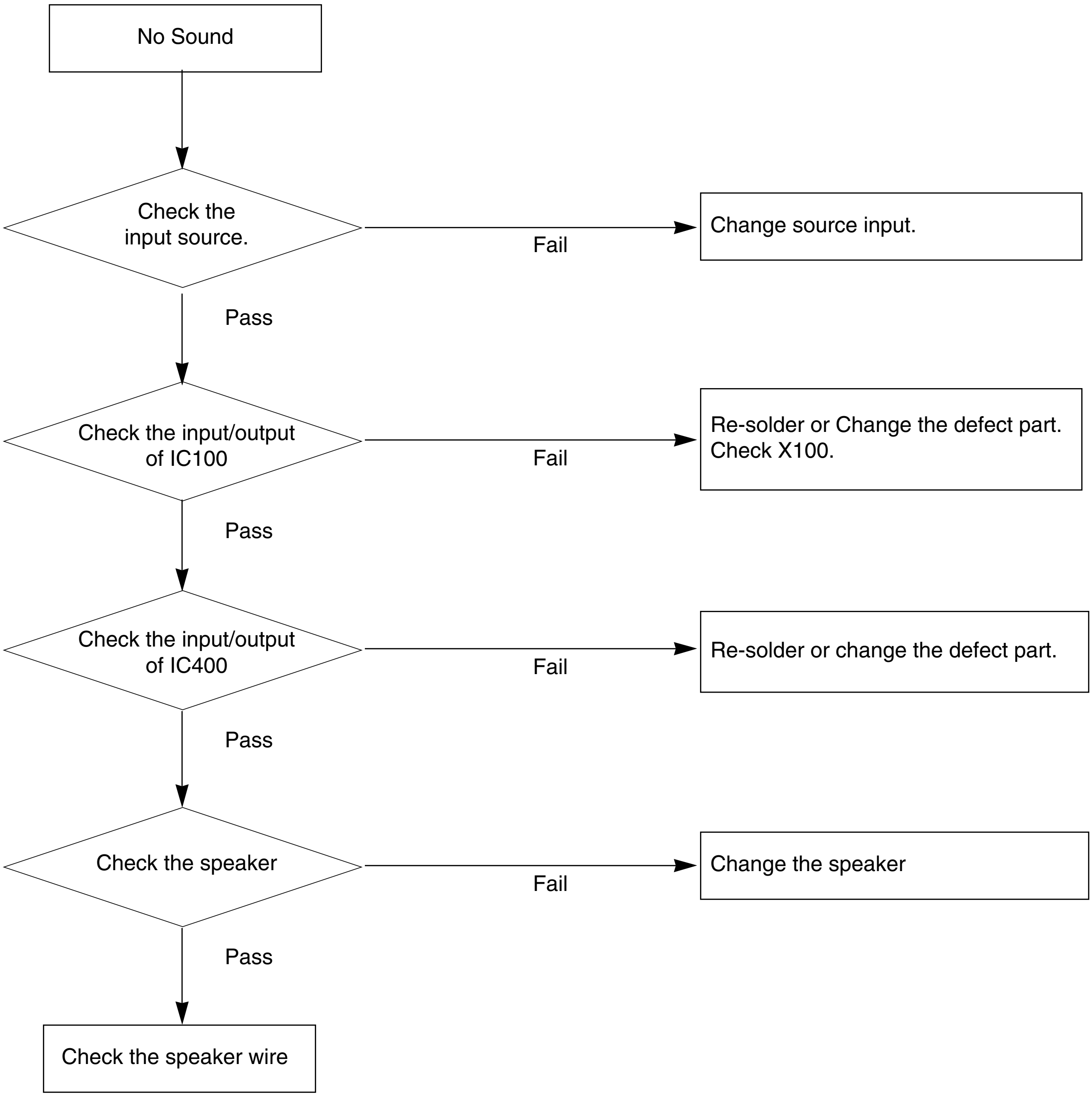
TROUBLESHOOTING



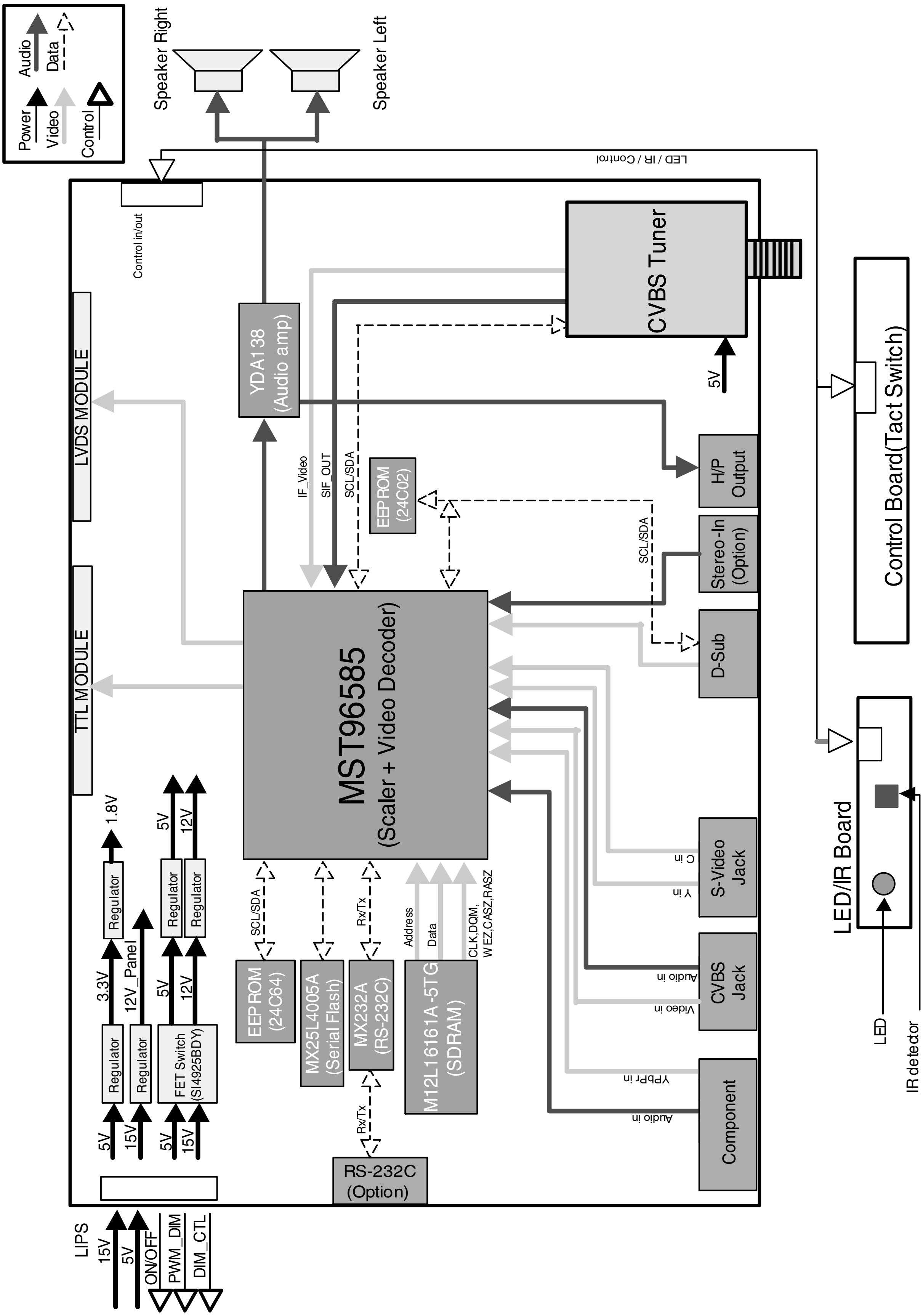
:[B]Process


No Raster
Check LED Status on display unit.
Fail
Repeat [A] PROCESS.
Pass
Check IC900, IC901, IC906, IC908, IC909, IC910.
Fail
Change IC900, IC901, IC906, IC908, IC909, IC910.
Pass
Check the input/ Output of IC100.
Fail
Change IC100.
Pass
Check inverter connector or inverter.
Fail
Change inverter connector or inverter.
Pass
Check panel link cable or module.
Fail
Change panel link cable or module.
Pass
Check inputting source cable and jack.


No Raster on AV Signal
(Component, CVBS, S-VHS)
No Raster on TV(RF) signal
Repeat
[A] Process .
Fail
Check the output
of TU500.
Fail
Check 5V of TU500.
Re-solder or change the
defect part.
Pass
Check the
signal of R103, R104,
R106, R108, R132, L822,
L800, L801.
Fail
Change R103, R104, R106, R108,
R132, L822, L800, L801.
Pass
Check the
input/ output of IC100.
Fail
Re-solder or change the defect part.
Check X100.
Pass
Check inputting source cable
and jack.

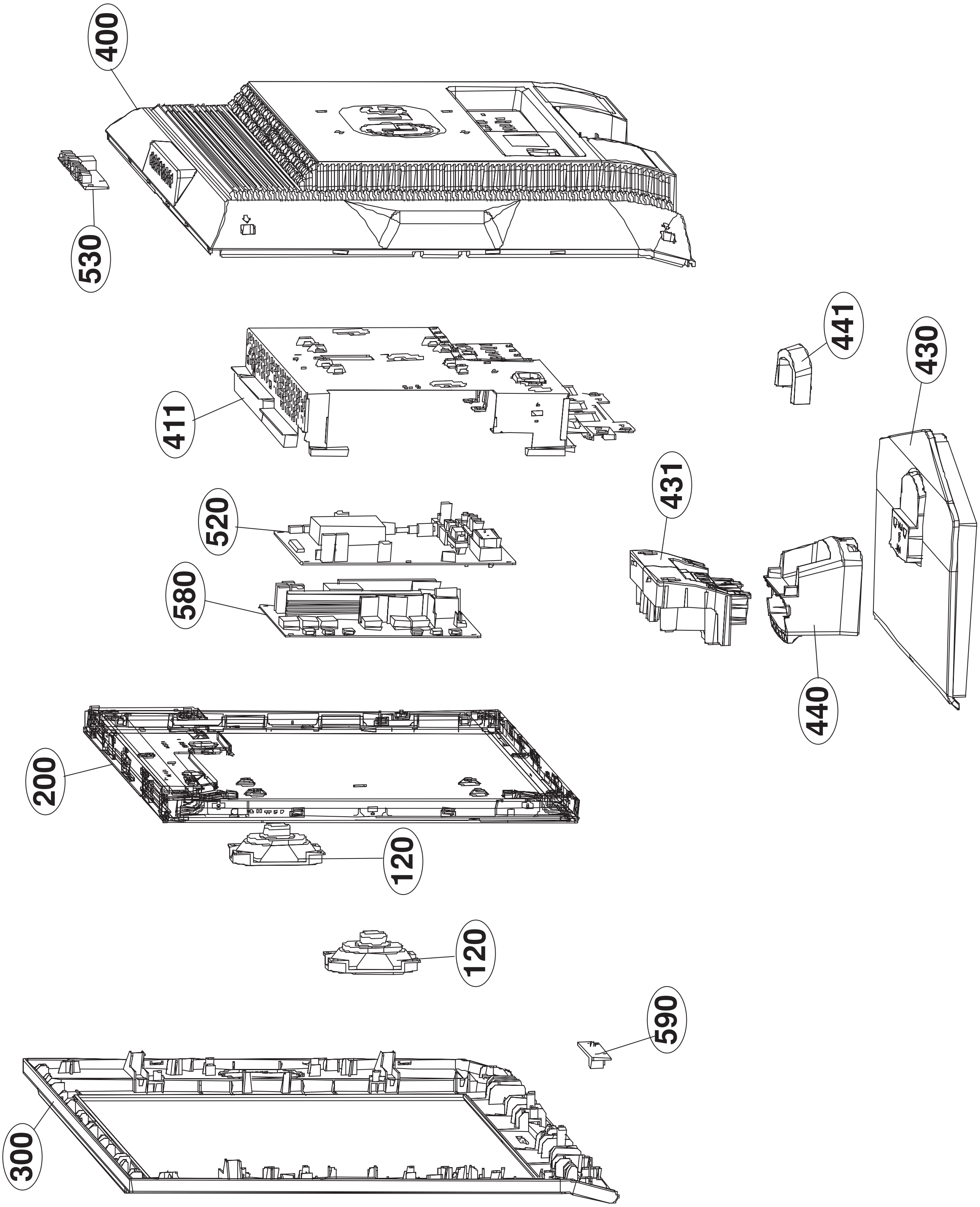

No Sound
Check the input source.
Fail
Change source input.
Pass
Check the input/output of IC100
Fail
Re-solder or Change the defect part.
Check X100.
Pass
Check the input/output of IC400
Fail
Re-solder or change the defect part.
Pass
Check the speaker
Fail
Change the speaker
Pass
Check the speaker wire

BLOCK DIAGRAM



MEMO

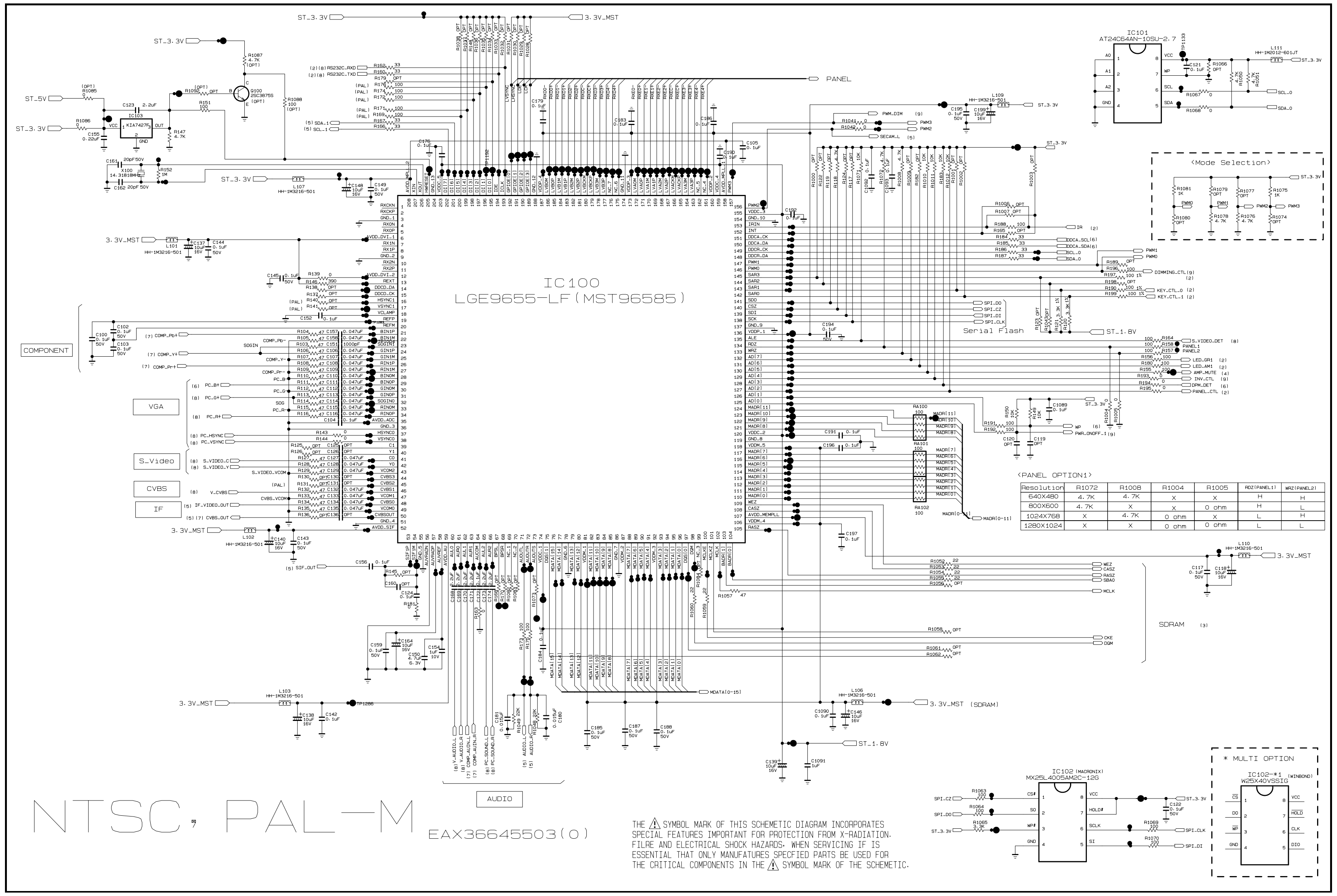
EXPLODED VIEW



EXPLODED VIEW PARTS LIST

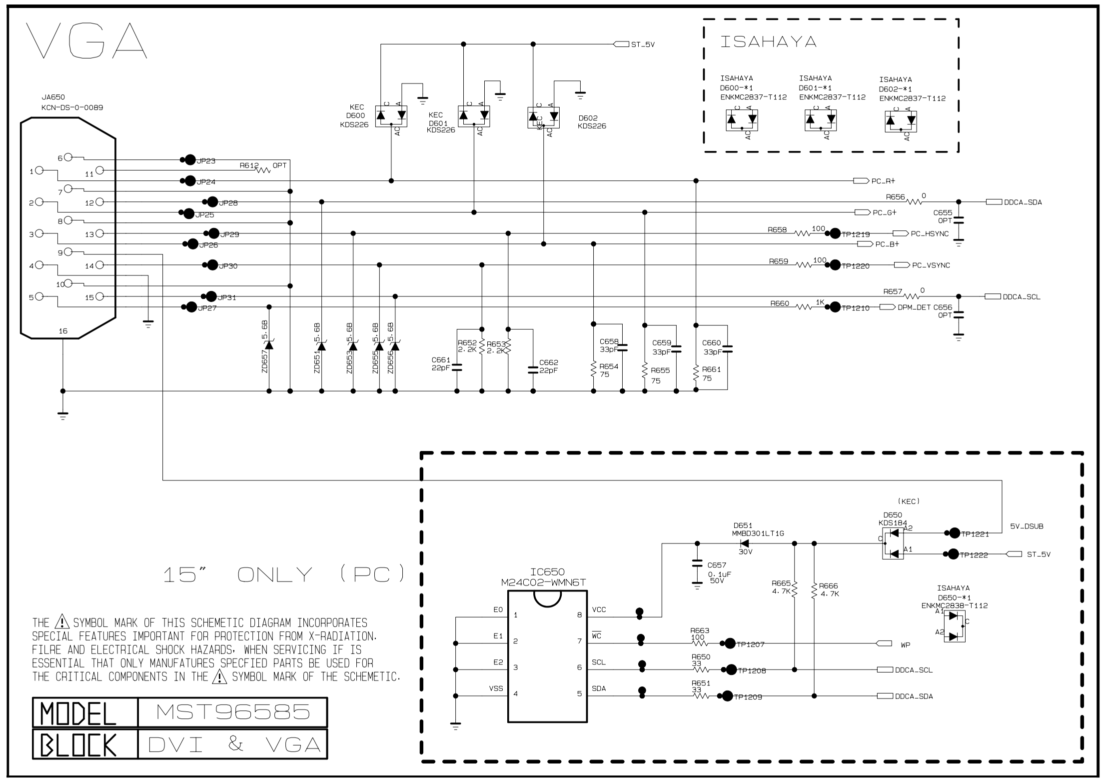
*** Note:** Safety mark ⚠

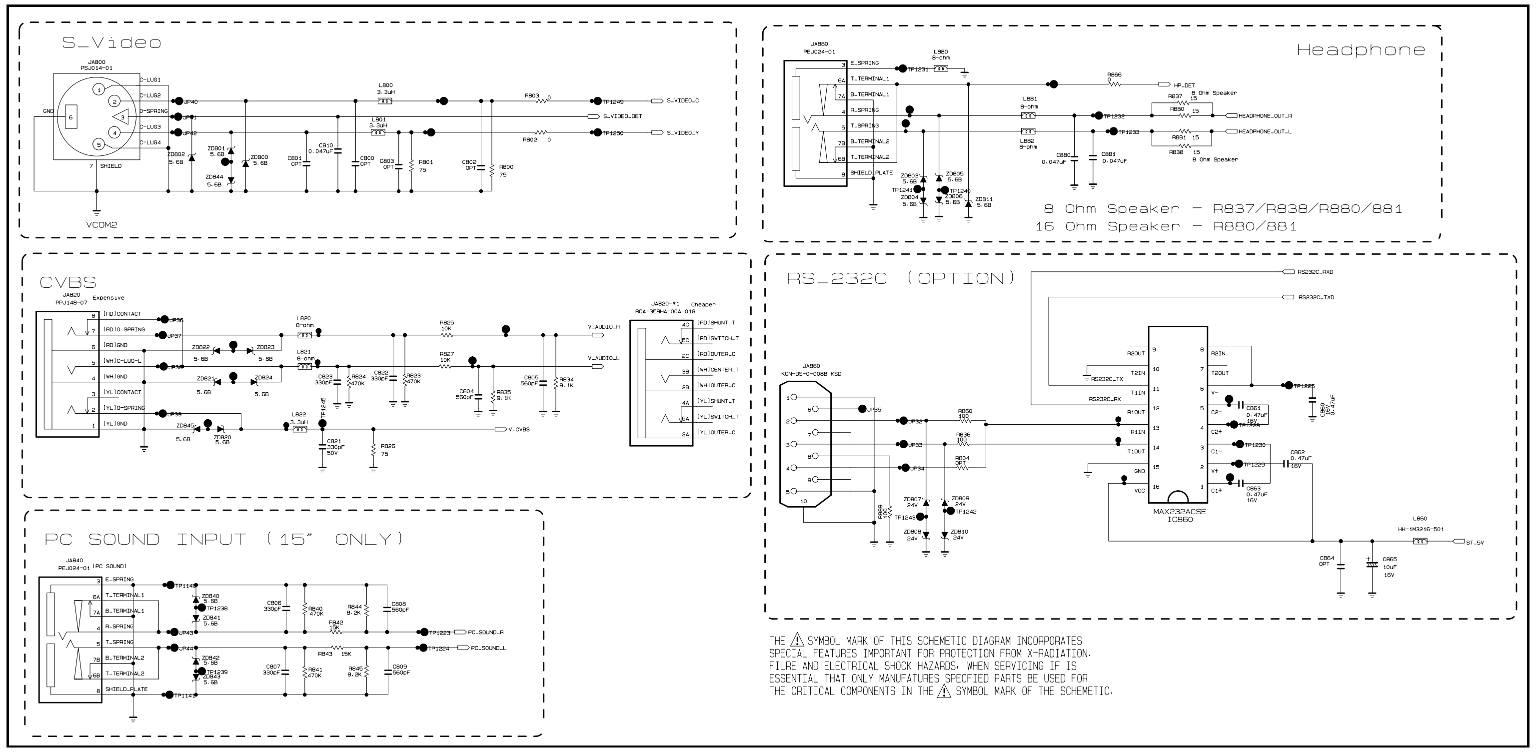
No.	PART NO.		DESCRIPTION
120		EAB30826701	“Speaker,Full Range EN1527C-6603-1. ND 7W 8OHM 80DB 170HZ 71.5 X 42 X 29.5 LUG
200	⚠	6304FCP009A	LCD,Module-TFT CLAA150XP03 DRIVER 15INCH 1024X768 400CD COLOR 72% 4/3 700:1
300	⚠	ABJ30646508	Cabinet Assembly 15LS1R LP68A 15” 15 CABINET SILVER CPT/AUO , BB3 , W/LED PCB
400	⚠	ACQ30646708	Cover Assembly 15LS1R LP68A 15” 51SF BK BACK COVER , NTSC BB3
411		ADV30635221	Frame Assembly 15LS1R LP68A 15” 15LS1R NTSC BB3
430	⚠	AAN30646903	Base Assembly STAND 15LS1R CL81 15LS1R COVER BASE ASSY , SILVER-SPRAY
431		AAN31022501	Base Assembly STAND 15LS1R CL81 15LS1R STAND BODY ASSY
440		MCK30214203	Cover MOLD HIPS 51SF HIPS 51SF 20/15 LS1R STAND BODY COVER , SILVER SPRAY
441		MCK30233401	Cover MOLD HIPS 51SF LS1R HIPS 51SF LS1R-holder cable management
520		EBU36682701	Main Total Assembly 15LS1RA-MK BRAND LN71A
530		EBR31760601	PCB Assembly SUB T.T LP68A LS1R-ZK ALRDLFX BB3 control
580	⚠	6871TPT318E	PCB Assembly,Power PLLM-M602A POWER T.T CMO L225W 22””Wide Scaler Dimming
590		EBR31760701	PCB Assembly SUB T.T - LS1R-ZI ALRDLFX BB3 LED

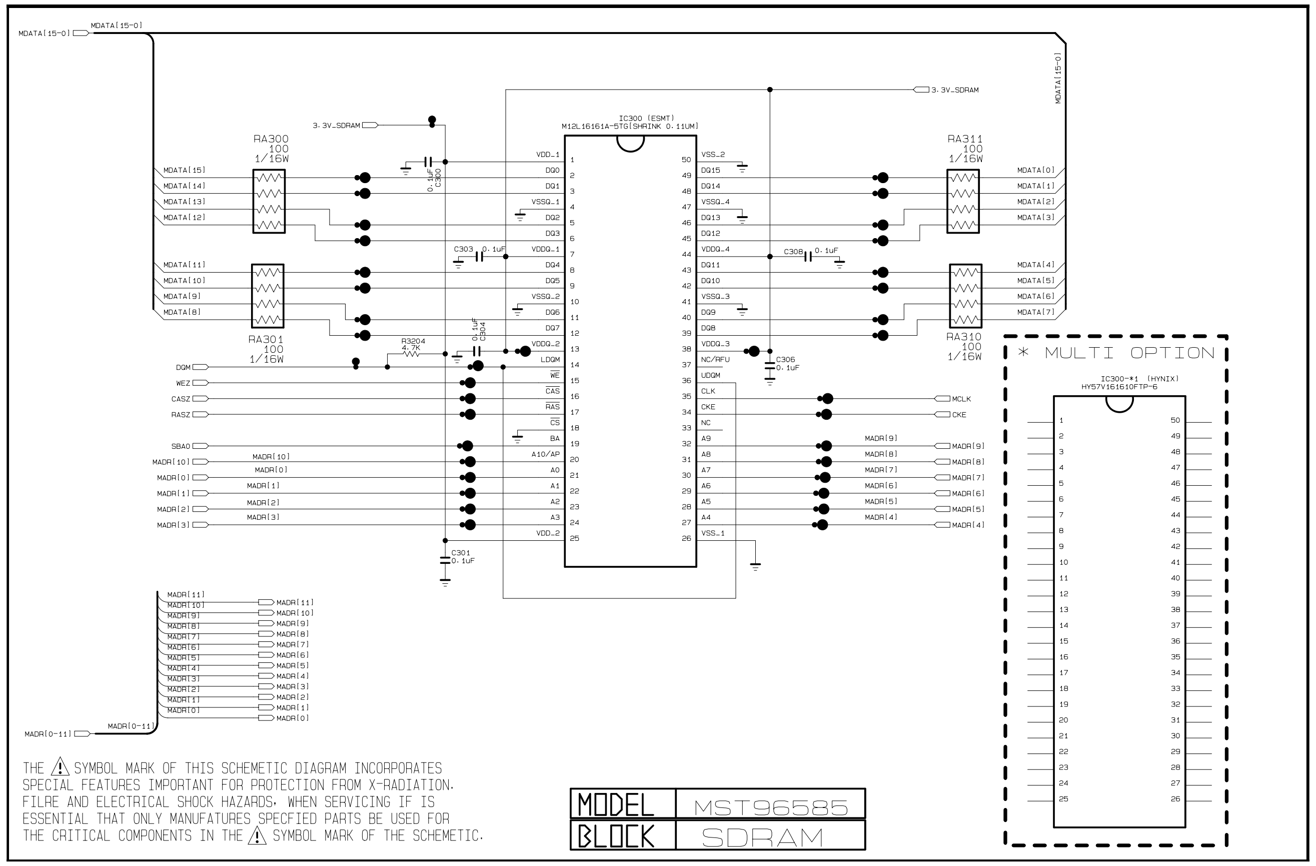


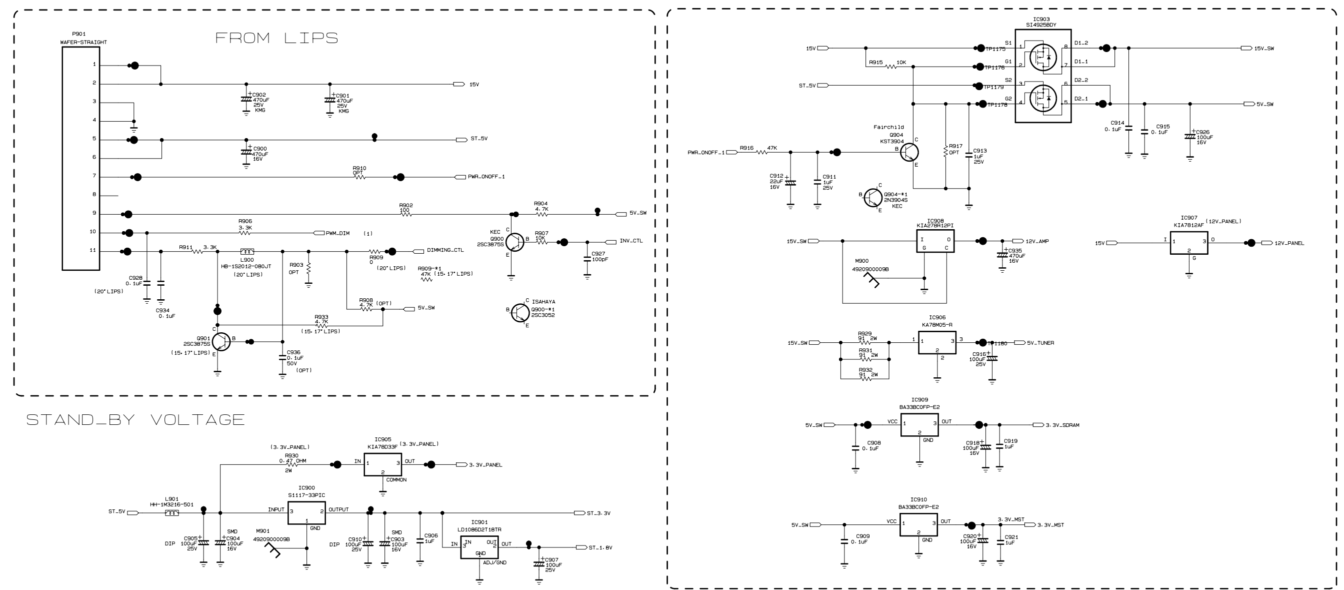
<PANEL OPTION1>

Resolution	R1072	R1008	R1004	R1005	RDZ(PANEL1)	WRZ(PANEL2)
640X480	4.7K	4.7K	X	X	H	H
800X600	4.7K	X	X	0 ohm	H	L
1024X768	X	4.7K	0 ohm	X	L	H
1280X1024	X	X	0 ohm	0 ohm	L	L



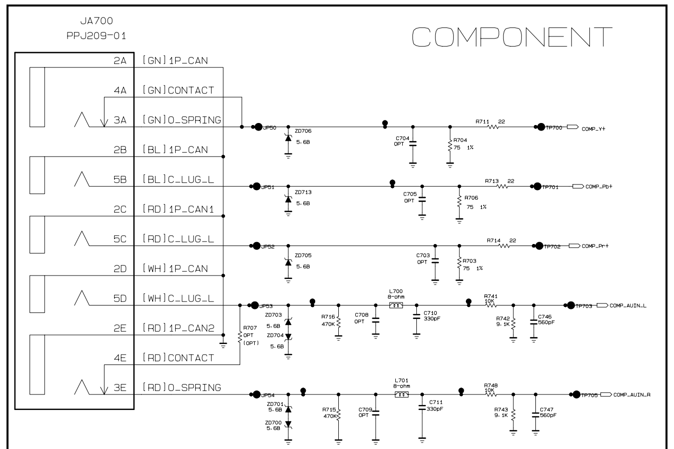




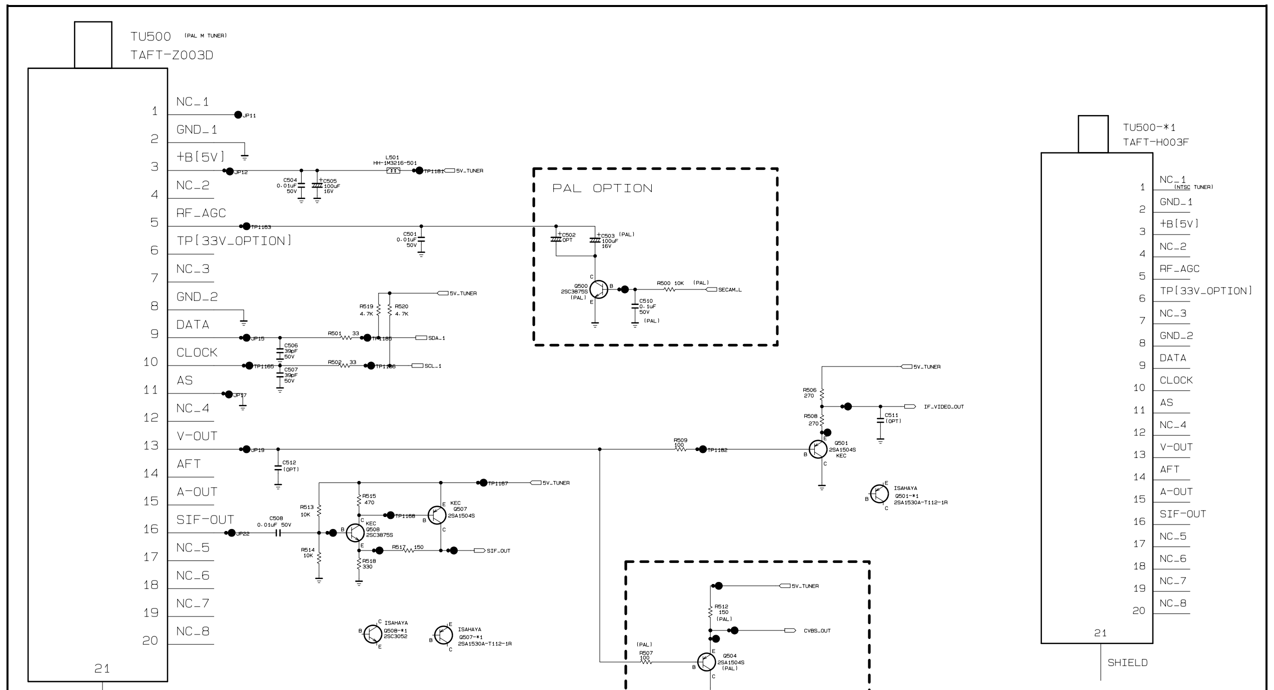


	AUO, CPT15" (3.3V)	LPL15" (5V)	17, 19" MFT (5V)	20" LPL 4:3 (12V)	20" 4:3 (5V)
IC905	O	X	X	X	X
R930	O	X	X	X	X
IC907	X	X	X	O	X

THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION, FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

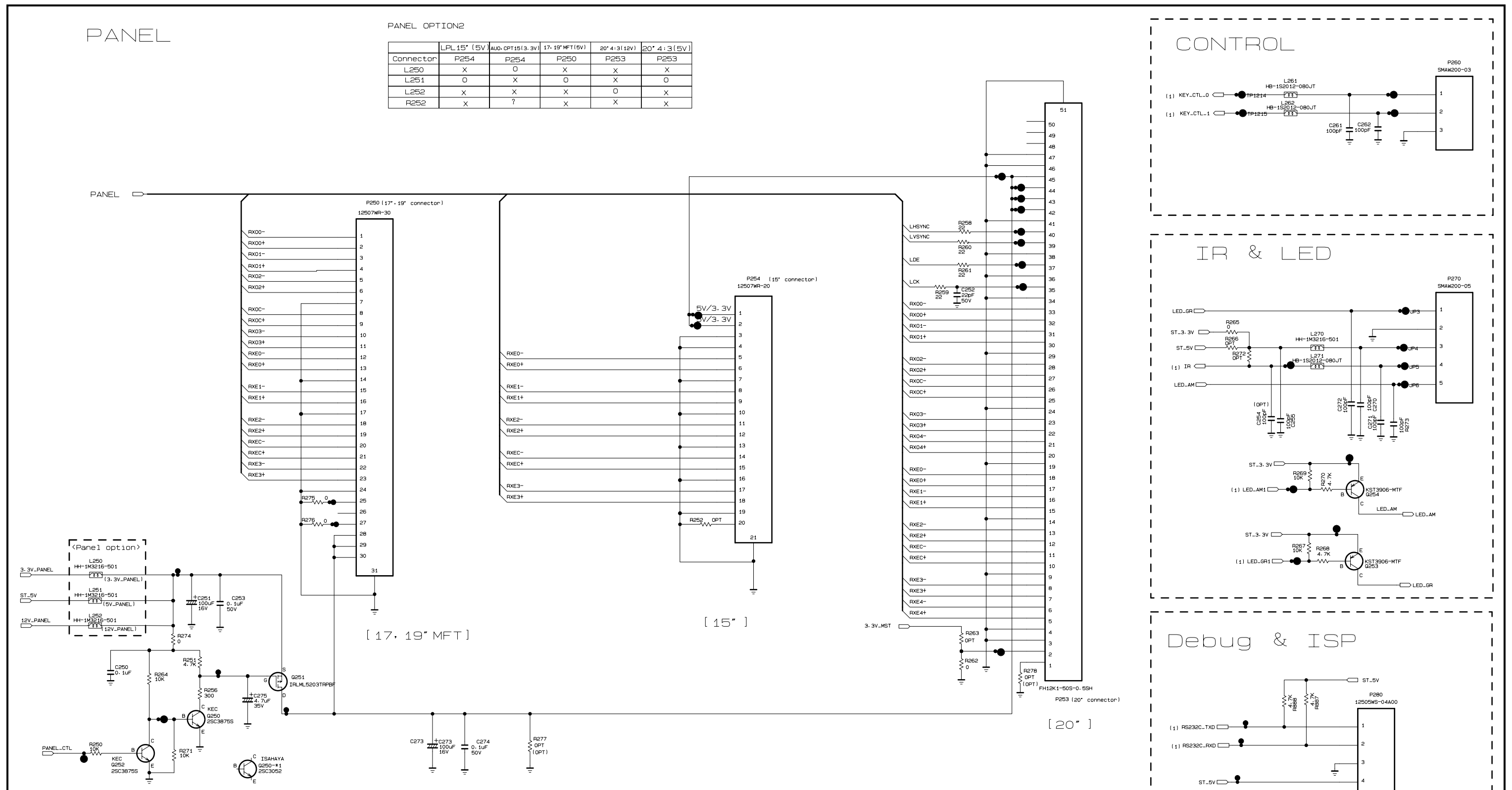


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MODEL	MST96585
BLOCK	TUNER

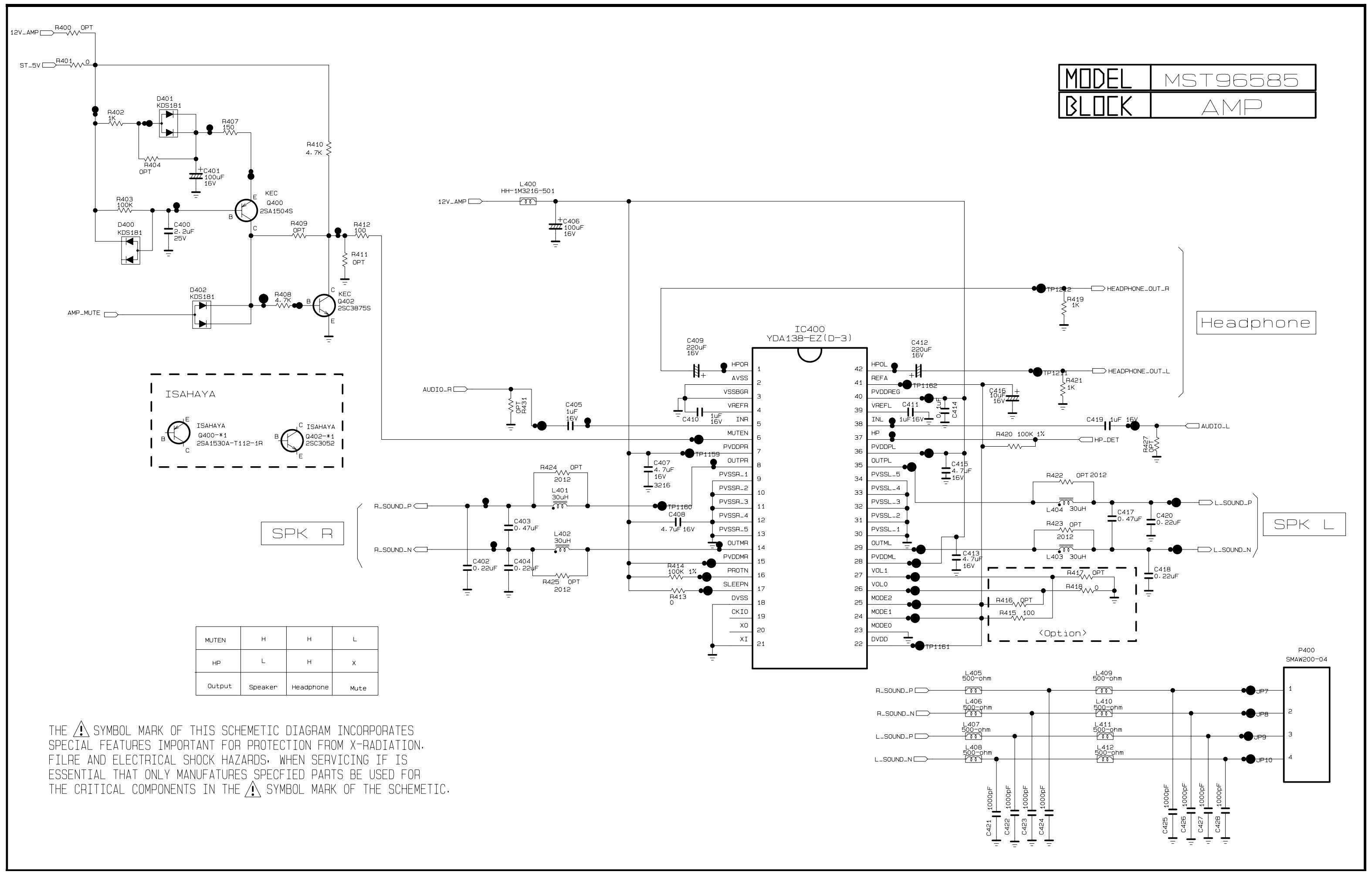


PANEL OPTION2

	LPL15" (5V)	AUO, CPT15 (3.3V)	17, 19" MFT (5V)	20" 4:3 (12V)	20" 4:3 (5V)
Connector	P254	P254	P250	P253	P253
L250	X	O	X	X	X
L251	O	X	O	X	O
L252	X	X	X	O	X
R252	X	?	X	X	X

THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION, FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

MODEL	MST96585
BLOCK	PANEL & Connector



MODEL	MST96585
BLOCK	AMP

MUTEN	H	H	L
HP	L	H	X
Output	Speaker	Headphone	Mute

THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION, FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

LG Electronics Inc.

P/NO : MFL37762601

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